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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/402,144	09/29/1999	MARTINA HANCK	1991784	5593

29177 7590 02/21/2007  
BELL, BOYD & LLOYD, LLP  
P.O. BOX 1135  
CHICAGO, IL 60690

EXAMINER

KIM, JUNG W

ART UNIT	PAPER NUMBER
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2132

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/21/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 09/402,144	<b>Applicant(s)</b> HANCK ET AL.	
	<b>Examiner</b> Jung Kim	<b>Art Unit</b> 2132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 10-12, 22-33 and 37-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 10-12, 22-33 and 37-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This Office action is in response to the RCE filed on 12/22/2006.
2. Claims 1-3, 10-12, 22-33 and 37-48 are pending.

#### ***Continued Examination Under 37 CFR 1.114***

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 12/22/2006 has been entered.

#### ***Response to Arguments***

4. On pg. 10 of the Remarks, applicant argues that "Kilner proposes a cryptographic function that necessarily relies on flow control of individual data segments (col.1 41-55; col. 2, lines 44-55; col. 3, lines 51-65), as each checksum is specifically directed to changes in specific places of a record database and affiliating an old checksum value from the cumulative checksum (see claim 1)" and hence does not cover the new limitations "wherein flow control for the data segments is negated by the commutative operation" in the independent claims. Examiner respectfully disagrees. The cumulative checksums (A\_CRC, V\_CRC and S\_CRC) are not dependent on the ordering of the data entries because

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these are values determined by commutative operations on the individual data CRC checksums; irrespective of the order the data is received and stored into the database, A\_CRC, V\_CRC and S\_CRC values do not change. Hence, contrary to applicant's allegations, Kilner's cryptographic function does not rely on flow control of individual data segments.

5. Finally, with respect to applicant's argument that there is no motivation to combine the teaching of Kilner and Frezza because the checksum in Kilner is already secure (Remarks, pg. 12, 2<sup>nd</sup> full paragraph), examiner disagrees.

Contrary to applicant's allegations, Kilner never discloses that the commutative checksum is secure. The commutative checksums are reversible, so they provide no security to an intentional attack that replaces the original data along with the original data checksums with different data having different data checksums. All an attacker would need to do is to ensure that the cumulative XOR value of the different data checksums equal the commutative checksum.

6. For the aforementioned reasons, the amended claims remain rejected under the prior art of record.

#### ***Claim Rejections - 35 USC § 112***

7. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 11 recites the limitation "said first commutative checksum." There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

9. Claims 1-3, 10-12, 22-33 and 37-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kilner USPN 5,649,089 in view of Frezza et al. U.S. Patent No. 4,982,430 (hereinafter Frezza); subject matter in McNamara et al. USPN 4,533,948 is relied upon since the McNamara patent is incorporated by reference into the Frezza patent (hereinafter McNamara).
10. As per claim 10, Kilner discloses an arrangement for forming a first commutative checksum for digital data which are grouped into a number of data segments, the arrangement comprising:
- a. an arithmetic and logic unit, (fig. 1, reference nos. 112 and 115)
  - b. a first segment checksum, which is formed for each of the data segment in accordance with a type selected from the group consisting of a hashing value and a cryptographic one-way function, (fig. 1, reference no. 124)
  - c. a commutative operation which forms the first commutative checksum by operating on the segment checksums, wherein flow control for the data segments is negated by the commutative operation (fig. 1, reference no. 130; irrespective of the order the data is received and stored into the database, A\_CRC, V\_CRC and S\_CRC values remains the same)
11. Kilner does not disclose a cryptographic operation to protect the first commutative checksum. Frezza teaches encrypting integrity values prior to

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submitting the integrity value over a network link to prevent unauthorized alteration of a message. Frezza, col. 2:45-3:13. It would be obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kilner by including a cryptographic operation to secure the first commutative checksum. One would be motivated to do so to prevent an unscrupulous third party from an unauthorized modification of a transmitted message (Frezza, col. 2:20-25). The aforementioned cover the limitations of claim 10.

12. As per claim 12, the rejection of claim 10 under 35 USC 103(a) as being unpatentable over Kilner in view of Frezza is incorporated herein. In addition, the arrangement also includes the following:

- d. an inverse cryptographic operation to form a first commutative checksum from the cryptographic commutative checksum, (Frezza, col. 1:12-19; 5:50-58; McNamara, 7:34-42; 8:25-35; data encrypted by DES has an inverse operation to retrieve the original data; furthermore, every ciphertext is associated with a specific plaintext);

- e. a second segment checksum which is formed for each of the data segment of the digital data to which the first commutative checksum is allocated, a commutative operation which operates on the second segment checksum which forms a second commutative checksum wherein flow control for the data segments is negated by the commutative operation, and a comparator which checks for a match between the second commutative checksum and a reconstructed first commutative

checksum, wherein the first and second segment checksum are formed in accordance with a type selected from the group consisting of a hashing value and a cryptographic one-way function. (Kilner, 5:5:48-6:15; fig. 3, reference nos. 311 and 312; resync operation regenerates S\_CRC; S\_CRC is compared with V\_CRC. Because the first commutative checksum uses first segment checksums for each data segment using a CRC technique, the second commutative checksum, which is used to verify the validity of the first commutative checksum, also generates second segment checksums for each data segment using a CRC technique).

13. It would be obvious to one of ordinary skill in the art at the time the invention was made to implement a cryptographic operation to secure the first commutative checksum. One would be motivated to do so to prevent an unscrupulous third party from an unauthorized modification of a transmitted message (Frezza, col. 2:20-25). The aforementioned cover the limitations of claim 12.

14. As per claim 11, it is a claim corresponding to claim 12, and it does not teach or define above the information claimed in claim 12. Therefore, claim 11 is rejected as being unpatentable over Kilner in view of Frezza for the same reasons set forth in the rejection of claim 12.

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15. As per claim 37, Kilner in view of Frezza cover the following: 1) an arrangement for forming a first commutative checksum, 2) an arrangement for checking a predetermined cryptographic commutative checksum, and 3) an arrangement for forming and checking a first commutative checksum as outlined above in the claim 10 rejection 35 U.S.C. 103(a). In addition, the cryptographic operations described use a symmetric key methodology (Frezza, col. 1:12-19; 5:50-58; McNamara, 7:34-42; 8:25-35).

16. As per claims 38 and 39, Kilner in view of Frezza cover the following: 1) an arrangement for forming a first commutative checksum, 2) an arrangement for checking a predetermined cryptographic commutative checksum, and 3) an arrangement for forming and checking a first commutative checksum as outlined above in the claim 11 and 12 rejections under 35 U.S.C. 103(a). In addition, the cryptographic operations described use a symmetric key methodology (Frezza, col. 1:12-19; 5:50-58; McNamara, 7:34-42; 8:25-35). The aforementioned cover the limitations of claims 38 and 39.

17. As per claims 40, Kilner in view of Frezza cover the following: 1) an arrangement for forming a first commutative checksum, 2) an arrangement for checking a predetermined cryptographic commutative checksum, and 3) an arrangement for forming and checking a first commutative checksum as outlined above in the claim 10 rejection under 35 U.S.C. 103(a). In addition, Kilner teaches the commutative operation to establish column parity, which forms the



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commutative checksums, is an XOR operation (Kilner, col. 3:52-65): the XOR operation exhibits both commutative and associative properties. The aforementioned cover the limitation of claim 40.

18. As per claims 41 and 42, Kilner in view of Frezza cover the following: 1) an arrangement for forming a first commutative checksum, 2) an arrangement for checking a predetermined cryptographic commutative checksum, and 3) an arrangement for forming and checking a first commutative checksum as outlined above in the claim 11 and 12 rejections under 35 U.S.C. 103(a). In addition, Kilner teaches the commutative operation to establish column parity, which forms the commutative checksums, is an XOR operation (Kilner, col. 3:52-65): the XOR operation exhibits both commutative and associative properties. The aforementioned cover the limitations of claims 41 and 42.

19. As per claim 43, Kilner in view of Frezza cover an arrangement as outlined above in the claim 10 rejection under 35 U.S.C. 103(a). Kilner does not expressly disclose archiving the digital data and the cryptographic commutative checksum. However, archiving the elements of a transmission is a standard feature to verify the contents of a transmission to an auditor. The examiner takes Official Notice that archiving transmission elements are standard means to record the transmission to prove the contents and status of the transmission at a latter date (i.e. auditing a transmission). It would be obvious to one of ordinary skill in the art at the time the invention was made to archive the digital data and

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the checksum since it preserves a receipt of the transmission. The aforementioned cover the limitations of claim 43.

20. As per claims 44 and 45, Kilner in view of Frezza cover an arrangement as outlined above in the claim 11 and 12 rejections under 35 U.S.C. 103(a). Kilner does not expressly disclose archiving the digital data and the cryptographic commutative checksum. However, archiving the elements of a transmission is a standard feature to verify the contents of a transmission to an auditor. The examiner takes Official Notice that archiving transmission elements are standard means to record the transmission to prove the contents and status of the transmission at a latter date (i.e. auditing a transmission). It would be obvious to one of ordinary skill in the art at the time the invention was made to archive the digital data and the checksum since it preserves a receipt of the transmission. The aforementioned cover the limitations of claims 44 and 45.

21. As per claim 46, Kilner in view of Frezza cover the following: 1) an arrangement for forming a first commutative checksum, 2) an arrangement for checking a predetermined cryptographic commutative checksum, and 3) an arrangement for forming and checking a first commutative checksum as outlined above in the claim 10 rejections under 35 U.S.C. 103(a). In addition, as mentioned previously, the digital data is cryptographically protected, and by convention, the cryptographic operation would be implemented by an ALU. Furthermore, since Kilner discloses sending the digital data as well as the

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checksum values and commutative checksum value from the active database to a standby database over a network link (col. 3:14-19, and figs.1-4), and Frezza teaches securing the integrity value being transmitting over a digital network, the digital data would necessarily be processed in accordance with a network management protocol. The aforementioned cover the limitation of claim 46.

22. As per claims 47 and 48, Kilner in view of Frezza cover the following: 1) an arrangement for forming a first commutative checksum, 2) an arrangement for checking a predetermined cryptographic commutative checksum, and 3) an arrangement for forming and checking a first commutative checksum as outlined above in the claim 11 and 12 rejections under 35 U.S.C. 103(a). In addition, as mentioned previously, the digital data is cryptographically protected, and by convention, the cryptographic operation would be implemented by an ALU. Furthermore, since Kilner discloses sending the digital data as well as the checksum values and commutative checksum value from the active database to a standby database over a network link (col. 3:14-19, and figs.1-4), and Frezza teaches securing the integrity value being transmitting over a digital network, the digital data would necessarily be processed in accordance with a network management protocol. The aforementioned cover the limitations of claims 47 and 48.

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23. As per claims 1-3 and 22-33, they are method claims corresponding to the subject matter covered in the rejections of claims 10-12 and 37-48, and they do not teach or define above the information covered in the rejections of claims 10-12 and 37-48. Therefore, claims 1-3 and 22-33 are rejected under Kilner in view of Frezza for the same reasons set forth in the rejections of claims 10-12 and 37-48.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See enclosed PTO-892.

### ***Communications Inquiry***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung W. Kim whose telephone number is 571-272-3804. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on 571-272-3799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through

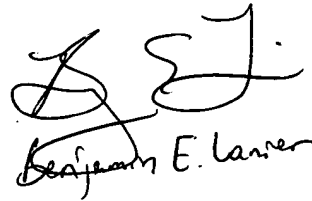
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Jk

February 17, 2007



Benjamin E. Lauer